

REMARKS

After a detailed and careful review of the Office Action and the instant response, applicants submit that the response is a complete and full reply to the Office Action.

Claims 1-21 are pending.

Claims 3-6 and 12-15 have been amended to put a space between a number and the unit that follows the number. The amendments to these claims are purely cosmetic and should not narrow the scope of the claims.

Claim Rejection -- 35 U.S.C. 102

Claims 1, 3 and 6 were rejected as anticipated by Yates et al (US Patent No. 4,171,626). Applicants respectfully traverse the rejection.

Yates et al discloses a carbon fiber reinforced composite drive shaft. The drive shaft comprises several layers within a resinous matrix material: an innermost layer containing glass fibers, an intermediate layer containing glass fibers, a second intermediate layer containing carbon fibers, and an outermost layer containing glass fibers (column 2, lines 27-42).

Claim 1 recites that the circumferential reinforced fiber sheet is in the outer surface layer. However, Yates et al fails to disclose a fiber reinforced plastic pipe comprising a circumferential reinforced fiber sheet provided on an outer surface layer. Thus, Yates et al fails to anticipate claims 1, 3 and 6. Withdrawal of the rejection is requested.

Claim Rejection -- 35 U.S.C. 103

Claims 1-21 were rejected as obvious over Nakajima et al (US Patent No. 6,409,606) in view of Yates et al. Applicants respectfully traverse the rejection.

Nakajima et al discloses a composite shaft for used as a power transmission shaft. The power transmission shaft of Nakajima et al comprises metal joint elements welded to a metal pipe, wherein a pipe formed of fiber reinforced plastic (FRP) with high flexural rigidity is inserted into the metal pipe to form a composite shaft (column 2, lines 29-41 and 49-55).

Applicants submit that claims 1 and 2 would not have been obvious over Nakajima et al in view of Yates et al. Nakajima et al does not teach or suggest a fiber reinforced plastic pipe having a circumferential reinforced fiber sheet on the inner or outer surface layer. The Office Action attempted to use the disclosures of Yates et al to modify the FRP pipe in the power transmission shaft of Nakajima et al. However, the attempt failed due to two reasons. First, Nakajima et al requires the FRP pipe to have a high flexural rigidity (column 2, lines 40-41), but Yates et al does not disclose that the composite drive shaft of Yates et al has a high flexural rigidity. Second, the composite drive shaft of Yates et al is designed to be used alone, in replacement of two-piece shafts (column 7, lines 16-17). Since the transmission shaft of Nakajima et al is a two-piece shaft, there would have been no motivation for a person of ordinary skill in the art to modify the FRP pipe in the two-piece shaft of Nakajima with the composite drive shaft of Yates et al. Thus, claims 1 and 2 should not have been rejected as obvious over Nakajima et al in view of Yates et al.

In addition to the reasons discussed above in relation to the obviousness rejection of claims 1 and 2, claims 3 and 4 would not have been obvious over Nakajima et al in view of Yates et al because Nakajima et al in view of Yates et al does not teach or suggest a fiber bundle in the wall of a plastic pipe having a tensile elasticity of 196 GPa or more (in claim 3), or 58.8 GPa or more (in claim 4). The Office Action asserts that the fibers used in the FRP pipe of Nakajima et al are known to be as strong as those set forth in Yates et al and would therefore inherently have the same elasticity. Applicants respectfully disagree because there is no evidence that the fibers used in Nakajima et al “are known to be as strong as those set forth in” Yates et al. Even if, for argument purpose, the fibers used in Nakajima et al were “known to be as strong as those set forth in” Yates et al, it does not mean that the fibers used in the FRP pipe of Nakajima et al would necessarily have the same elasticity as the fibers used in the drive shaft of Yates et al because fiber strength is not the same as fiber elasticity. This is another reason why claims 3 and 4 should not have been rejected as obvious.

The Office Action also takes a position that the elasticity recited in claims 3 and 4 would have been obvious because a person of ordinary skill in the art could arrive at the recited elasticity by optimizing, via routine experimentation, the elasticity of the fibers used by Nakajima et al. Applicants respectfully disagree. Nakajima et al is silent on the elasticity of the fibers used in the FRP pipe. Therefore, the person would not have been motivated to optimize the elasticity of the fibers used by Nakajima et al. This is yet another reason why claims 3 and 4 should not have been rejected as obvious.

In addition to the reasons discussed above against the obviousness rejection of claim 1 or 2, claims 5 and 6 would not have been obvious over Nakajima et al in view of

Yates et al because Nakajima et al in view of Yates et al does not teach or suggest the basis weight or thickness of the circumferential reinforced fiber sheet recited in claim 5 or 6. The Office Action takes a position that these recitations were obvious choices of mechanical expedients with optimization of the fibers used by Nakajima et al via routine experimentation. Applicants respectfully disagree because Nakajima et al is silent on any circumference reinforced fiber sheet in the FRP pipe, let alone the basis weight or thickness of the circumferential reinforced fiber sheet. Thus, the person of ordinary skill in the art would have no motivation to optimize the basis weight or thickness of the fibers used in the FRP pipe of Nakajima et al. This is another reason why claims 5 and 6 should not have been rejected as obvious.

Claims 7-21 should not have been rejected as obvious over Nakajima et al in view of Yates et al because the fiber reinforced plastic pipe recited in claims 7-21 was not taught or suggested by Nakajima et al in view of Yates et al. There would have been no motivation to replace the FRP pipe, with the composite drive shaft of Yates et al, in the power transmission shaft of Nakajima et al because Yates et al uses the composite drive shaft as a drive shaft *per se*, and not to be inserted into a metal pipe to form a two-piece shaft for used in a power transmission. Thus, claims 7-21 should not have been rejected as obvious over Nakajima et al in view of Yates et al.

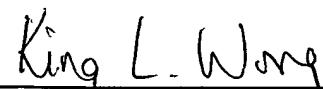
Withdrawal of the obviousness rejection of claims 1-21 is requested.

Conclusion

In view of the amendment and the above reasoning, applicants submit that the application is in a condition for allowance. A Notice of Allowance is believed in order.

In the event that the filing of this paper is not deemed timely, applicants petition for an appropriate extension of time. Any petition fee for the extension of time and any other fees that may be required in relation to this paper can be charged to Deposit Account No. 01-2300.

Respectfully submitted,



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Enclosure: Petition for Extension of Time
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